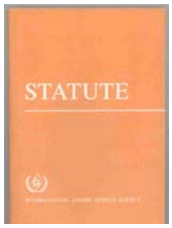
International Atomic Energy Agency

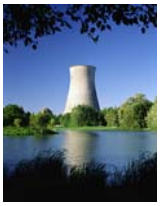
The IAEA Network of Centres of Excellence in Training and Demonstrations in Underground Research Facilities

ARTICLE II ***Objectives***



The Agency shall seek to accelerate and enlarge the contribution of Atomic Energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further military purpose.

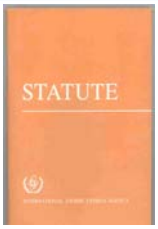
IAEA Areas of Activity



Technology

Safety

Verification & Security



ARTICLE III *Functions*

1. To encourage and assist research on, and development and practical application of, atomic energy for peaceful uses throughout the world;. . . . . and to perform any operation or service useful in research on, or development or practical application of, atomic energy for peaceful purposes.

2 To foster the exchange of scientific and technical information on peaceful uses of atomic energy

3 To encourage the exchange of training of scientists and experts in the field of peaceful uses of atomic energy

Programme L. MANAGEMENT OF RADIOACTIVE WASTE

Subprogramme L.4: Technologies for Disposable Radioactive Waste Management

Project L.4.02: Building confidence in geological disposal of radioactive waste

- Develop a Network of Centres of Excellence and increase the number of participants in Network related activities (CRP, TCtraining and scientific visits).
- Develop demonstration activities in underground research facilities that will help to facilitate the acceptance of geological disposal concepts.

GENERAL CONSIDERATIONS

Geological disposal is the preferred option for high level and long lived wastes.

The only facility commissioned to accept HLW for disposal is WIPP.

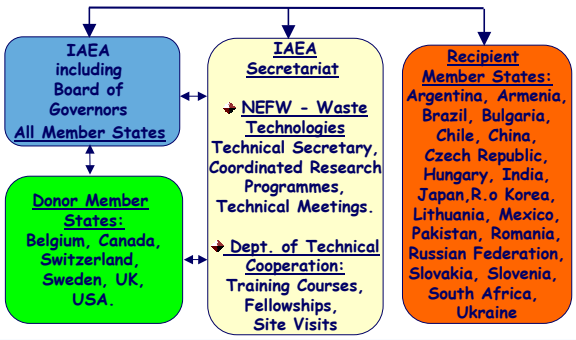
When siting and designing a geological disposal facility, scientific and engineering data about the site and the rock formation are needed. (Site specificity).

Underground research facilities (URFs) play an essential role in the process to adopt a disposal solution (Generic site and, otherwise, engineering development).

DEVELOPMENTS IN URF'S ROLE

- URFs have been used to develop expertise and hands-on experience at national and international levels for many years.
- There is a continuing interest in the conduct of demonstrations of disposal technologies.
- Member States without URFs wish to join R&D, demonstration and training projects in existing URFs

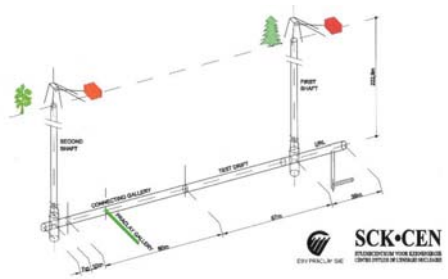
NETWORK MANAGEMENT



UNDERGROUND FACILITIES – NETWORK MEMBERS

- Belgium – EURIDICE/HADES Mol
- Canada – URL, Lac du Bonnet
- Sweden – Aspo
- Switzerland – Grimsel & Mont Terri
- United States of America – Yucca Mountain Project WIPP

Belgium – Euridice facility



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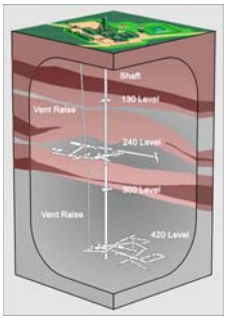
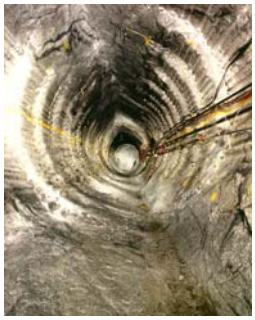
Canada – The Underground Research Laboratory





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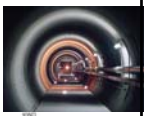
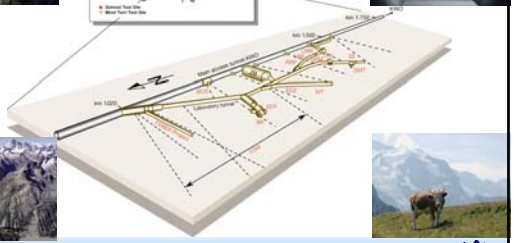
Switzerland – The Grimsel Test Facility





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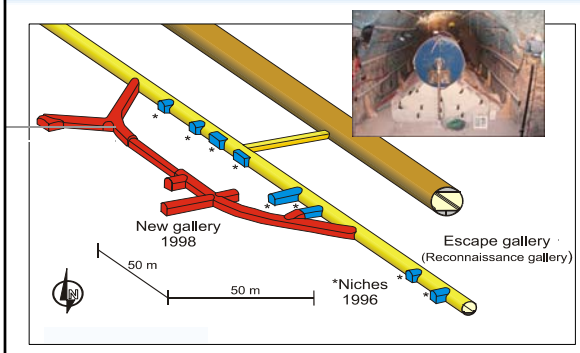
Switzerland – Mont Terri



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Sweden – Äspö Hard Rock Facility

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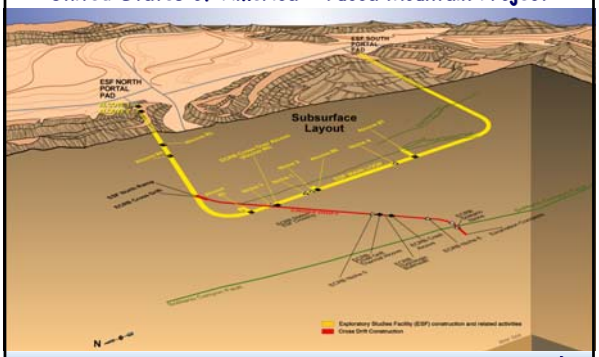
United States of America – Yucca Mountain Project



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SURFACE FACILITIES – NETWORK MEMBERS

Sweden
University of Kalmar

United Kingdom
Geo-environmental Research Centre
University of Cardiff, Wales

United States of America
Lawrence Berkeley National Laboratories
University of California

Associated with Underground Facilities. Allow for Academic Training, Fellowships and Scholarships And Sandwich Course-like Training.

IAEA Role

- Provide research coordination
- Support training
- Facilitate information exchange
- Provide for collaboration on demonstrations
- Preserve knowledge

Network Activities - Progress

Coordinated Research Programmes:

- Swelling Clays as Engineered Barriers (Led by SWE)

Applications invited 2002. Applications received from 28 Member States.
Contracts Awarded to CPR, CZR, RUS, KOR, SAF, UKR
Agreements awarded to BEL, CAN, IND and JPN
1st Meeting held November 2003. Next Oct 2004

- Numerical Modelling (Led by USA/GBR)

Programme being defined.
Expected that applications will be sought in 2004/5
Contracts and Agreement will be let in 2006.

Network Activities - Progress

Training 2003 – Technical Co-operation INT 9/173

- North American Training Course – General Training on Methodologies for Geological Disposal Aug 11-22
  Hosts: LBNL + Yucca Mountain (USA), URL (CAN).
  Recipients: ARG, CHI, BRA, KOR, IND, SAF, CZR, MEX.

- European Training Course - Methodologies for Geological Disposal (Fundamentals, Theory and Practice) 20 Oct to 7 Nov.
  Hosts: ITC + NAGRA (CH), SCK/CEN + ESV Euridice (BEL)
  Recipients: ARM, BUL, CRO, CZR, HUN, IND, LTU, ROM, RUS, SVK, SLO, UKR.

IAEA Scholars were provided with a review and summary of the "State of the Art" of Geological Disposal in Member States with the more advanced programmes. Reasons for the delays in creating a disposal facility were elucidated and fashionable issues of general interest, such as the prospect for an International Repository were debated. Some practical "hands-on" training was proferred and experienced.

Network Activities - Progress

Training 2004 – Technical Co-operation INT 9/173

- Visiting Fellows participating in the disassembly of the Tunnel Sealing Experiment. Feb – Apr.
  Host: AECL – URL (CAN)
  Recipients: CZR, SAF, UKR (Participants in Swelling Clays CRP)

- North American Training Course – General Training on Methodologies for Geological Disposal October 2004
  Hosts: USA - LBNL (5 days) + Yucca Mountain (2 days)
  Recipients: ARG,ARM,BUL,CZR,HUN,LIT,ROM,RF,SLO,SLK, SAF,UKR.

- European Training Course – Site Selection Procedures and Methodology (CZR) & the Fundamentals of Geological Disposal (CH). November.
  Hosts: CZR (4 days) CH (NAGRA - ITC) (5 days)
  Recipients: ARG,ARM,CH,CPR,HUN,IND,LIT,PAK,PHI,RF, SLO,SLK,SAF.

Network Activities - Programme

Training 2005/6 – Technical Co-operation INT 9/173 ?

- European & North American Training Course & Group Training
  Hosts will self selected according to the offers made by the Donor organizations and Member States. At present significant offers have been made by NAGRA, the ITC. Others from other Donor organizations are expected.
  In general, it is hoped that two Courses per year will be offered.
- Fellowships & Site Visits: These will be offered for underground work in accordance with opportunities as they arise in the participating organizations with underground facilities. Opportunities are expected to arise as major experiments are advanced. The focus is to provide "hands-on" experience for participants.
- Scholarships: Intended to meet some of the needs of the Agency's Knowledge Management programme. University/Agency scholarships for advanced degree programmes will be established for younger scientists and engineers.

Meeting Needs

- **Provide research coordination**
  - Achieved through co-ordinated research projects.
- **Support training**
  - Achieved through INT 9/173 – Training Courses, Fellowships, Group Training Activities
- **Facilitate information exchange**
  - Achieved through INT 9/173 – Training Courses Fellowships, Group Training and Site Visits. Also CRP Activities eventually lead to direct exchange of information and documentation.
- **Provide for collaboration on demonstrations**
  - Not yet clear how this can be achieved. Technical and Consultant's Meetings allow for discussion of possibilities.
- **Preserve knowledge**
  - CRP activities, Scholarships and documentation all assist in meeting this requirement.

Conclusions

- The Agency's Network of Centres of Excellence in Training and Demonstrations in Underground Research Facilities is meeting the Agency's Statutory Functions.
- The programme is well supported by the Donor Member States and is in high demand from the Recipient Member States.
- Generally the programme activities meet the derived needs of of both the Donor and Recipient Member States. Specifically, technologies are being effectively transferred and knowledge is being preserved through Training and Coordinated Research activities.
- It is not yet clear how one of the main objectives of the programme - facilitating the public acceptance of geological disposal concepts - can best be fully attained. This needs clearer definition and resolution.